

## **REMARKS**

In view of the following remarks, reconsideration of the rejections and further examination are respectfully requested.

Independent claims 1 and 10-12 have been amended to further define the features of the claimed invention which distinguish from the references referred to in the rejections discussed below.

Claims 1, 8, 9, and 12 were rejected under 35 U.S.C. § 102(b) as being anticipated by Weber (U.S. 5,864,261). Further, claims 2-7, 10, and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Weber. In addition, claims 1-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ella et al. (U.S. 6,518,860) in view of Tikka et al. (U.S. 6,407,649). These rejections are believed clearly inapplicable to amended independent claims 1 and 10-12 and the claims that depend therefrom for the following reasons.

Each of independent claims 1 and 10-12 includes recitations directed to an acoustic resonator. According to claims 1 and 10-12 the acoustic resonator includes an acoustic mirror layer and a piezoelectric thin film vibrator disposed on the acoustic mirror layer, and the piezoelectric thin film vibrator includes a lower electrode, a piezoelectric thin film, and an upper electrode. Moreover, claims 1 and 10-12 recite that (1) an uppermost impedance layer (of the plurality of impedance layers) contacts the lower electrode of the of the piezoelectric thin film vibrator such that the uppermost impedance layer contacting the lower electrode is a low acoustic impedance layer and the lower electrode is a different material than the low acoustic impedance layer contacting the lower electrode. Finally, claims 1 and 10-12 recite that (2) a band ratio that is larger than a maximum band ratio obtained when the thickness of the lower

electrode is equal to the thickness of the upper electrode is obtained in the acoustic mirror type thin film bulk acoustic resonator. The Weber, Ella, and Tikka references, or any combination thereof, do not disclose or suggest the above-mentioned distinguishing features (1) and (2) recited in independent claims 1 and 10-12.

Rather, Weber teaches a thin film resonator 30 having an upper electrode 36, a piezoelectric layer 35, and a bottom electrode 37, wherein the thin film resonator 30 is disposed on an acoustical isolator 40 comprised of stack pairs 42, 43, 44, and 45 (see Fig. 1; col. 4, lines 35-36; col. 4, lines 57-58). Further, Weber teaches that a top constituent of stack pair 42 is actually a portion of the bottom electrode 37. In addition, Weber teaches that the top constituent of the stack pair 42 (i.e., the bottom electrode 37) is a low impedance layer and that the bottom constituent of the stack pair 42 (i.e., the layer of the acoustical isolator 40 contacting the bottom electrode 37) is a high impedance layer (see col. 5, lines 22-32 and Fig. 1).

Thus, in view of the above, it is clear that Weber teaches that the bottom electrode is a low impedance layer and the bottom constituent of the stack pair contacting the bottom electrode is a high impedance layer, but fails to disclose or suggest that (i) the uppermost impedance layer that contacts the lower electrode is a low acoustic impedance layer and the lower electrode is a different material than the low acoustic impedance layer contacting the lower electrode (e.g., a high impedance layer), as required by claims 1 and 10-12.

Further, Weber merely describes an example of a resonator, but also fails to disclose or suggest that a band ratio that is larger than a maximum band ratio obtained when the thickness of the lower electrode is equal to the thickness of the upper electrode is obtained in the acoustic mirror type thin film bulk acoustic resonator, as recited in claims 1 and 10-12. Therefore,

because of the above-mentioned distinctions it is believed clear that claims 1 and 10-12 are not anticipated by Weber.

In view of the above, it is respectfully submitted that Weber does not suggest the above-discussed limitations of claims 1 and 10-12. Therefore, it would not have been obvious to one of ordinary skill in the art to modify Weber so as to obtain the invention of claims 1 and 10-12. Accordingly, it is respectfully submitted that independent claims 1 and 10-12 and dependent claims 2-9 are clearly allowable over Weber.

In addition, the 35 U.S.C. §103(a) rejection of claims 1-12, for being unpatentable over the combination of Ella and Tikka, is believed clearly inapplicable for the following reasons.

Tikka teaches a resonator including a top electrode, a piezoelectric layer, a Tx tuning layer, and a bottom electrode (see Fig. 7), but fails to disclose or suggest that a band ratio that is larger than a maximum band ratio obtained when the thickness of the lower electrode is equal to the thickness of the upper electrode is obtained in the acoustic mirror type thin film bulk acoustic resonator, as recited in claims 1 and 10-12.

Ella also teaches a resonator, but fails to disclose or suggest that a band ratio that is larger than a maximum band ratio obtained when the thickness of the lower electrode is equal to the thickness of the upper electrode is obtained in the acoustic mirror type thin film bulk acoustic resonator, as recited in claims 1 and 10-12.

Therefore it is clear that the combination of Ella and Tikka does not render claims 1 and 10-12, and the claims that depend therefrom, obvious. Furthermore, it would not have been obvious to one of ordinary skill in the art to modify Ella and Tikka so as to obtain the invention of independent claims 1 and 10-12. Accordingly, it is respectfully submitted that independent claims 1 and 10-12 and dependent claims 2-9 are clearly allowable over the combination of Ella and Tikka.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance and an early notification thereof is earnestly requested. The Examiner is invited to contact the undersigned by telephone to resolve any remaining issues.

Respectfully submitted,

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